

Application of Data Standards in Justice Information Sharing

Mike Hulme
Architecture Director

**Unisys Justice & Public Safety
Programs**

mike.hulme@unisys.com



Data Standards (GJXDM)

		<i>Focus</i>					
		Data <i>What</i>	Function <i>How</i>	Network <i>Where</i>	People <i>Who</i>	Time <i>When</i>	Motivation <i>Why</i>
<i>Perspective</i>	Scope (Contextual) <i>Planner</i>	Subject Areas	Mission & Focus	Location Types	Organization Units	Business Mandates	Laws, Policy Strategic Plans
	Enterprise Model (Conceptual) <i>Owner</i>	Conceptual Data Model	Business Functions	Workplace & Locations	Organization Chart	Transition Strategy	Performance Plans
	System Model (Logical) <i>Designer</i>	Logical Data Model	Logical Applications Architecture	Technology Architecture	Interface Architecture	Processing Structure	Business Rule Model
	Technology Model (Physical) <i>Builder</i>	Physical Data Model	System Design	Distributed Architecture	Presentation Architecture	Control Structure	Rule Design
	Detailed Representations (Out-of-context) <i>Sub-contractor</i>	Data Definitions	Program	Network Architecture Description	Security Architecture	Timing Definition	Rule Specification
	Functioning Enterprise	Data	Function	Network	Organization	Schedule	Strategy

Topics

- Global Justice XML Data Model (GJXDM) definition
- Benefits
- Potential barriers
- Development and maintenance
- Design and content
- Extension
- Subset schemas, reference schemas
- Conformance
- Implementation
- Questions and discussion

What is the GJXDM?

The GJXDM is an object-oriented data model comprised of a well-defined vocabulary of approximately 2,750 stable data objects, or reusable components, that facilitate the exchange and reuse of information from multiple sources and multiple applications.

GJXDM Purpose

The purpose of the GJXDM is to provide a consistent, extensible, maintainable XML schema reference specification for data elements and types that represent the data requirements of the general justice and public safety communities.

A secondary goal is to provide a baseline model for the data dictionary that can be represented in advanced technologies beyond XML Schema.

GJXDM Vision

Adoption and implementation of the GJXDM significantly advances justice information sharing by providing a common language that reduces cost and technical barriers

GJXDM v. GJXDD

- GJXDM is an object-oriented data model that specifies a representation structure for the GJXDD
- GJXDM (structure) and the GJXDD (semantics) are integrated and implemented as a relational database
- This database is used to generate a consistent representation in XML Schema

GJXDM Benefits

- Can lead to increased information sharing
 - As more products and solutions are developed or enhanced to use the GJXDM
 - Can be applied to new solutions, existing products, legacy systems
 - Reduces cost and technical barriers to information sharing

GJXDM Benefits (cont.)

- Can reduce development and maintenance costs (after learning curve!) because:
 - XML development and implementation tools:
 - Are readily available and improving
 - Significantly enhance productivity
 - XML and related standards are becoming widely known and understood by developers and implementers
 - GJXDM is (slowly) becoming more widely deployed and understood

GJXDM Benefits (cont.)

- Can reduce technical barriers because:
 - You don't have to invent a format to share information among justice information systems every time
 - XML can be readily parsed and transformed for consumption by information systems and users
 - Products are beginning to support GJXDM

GJXDM Benefits (cont.)

- Inclusive of the entire justice domain (almost)
 - GJXDM was built from existing data models, dictionaries, processes, and document specs
- Readily adaptable and extendable to meet the specific needs of an enterprise (national, state, regional, and local)
- Object oriented:
 - Provides good organizational context
 - Promotes reuse, reduces number of elements
 - Facilitates extension
- Supports relationships for information context

Potential Barriers

- Not everyone will share the vision
- The GJXDM is a big compromise: everyone will find one or more things they don't like about it
- Different from what most people are used to
- Appears big and complex
- Lack of training and understanding leads to overwhelming confusion
- Often seems more difficult than what you would come up with on your own to implement a particular exchange

Potential Barriers (cont.)

- GJXDM learning curve inconsistent with project timeline and cost
- Developers want to do what they want to do
 - If you ask them if they *want* to use it, they may say no
 - If you ask them if they *can* use it, they may say no
 - Ask them to substantiate their objections with facts and get a second opinion
 - Don't let them take advantage of lack of technical knowledge by management

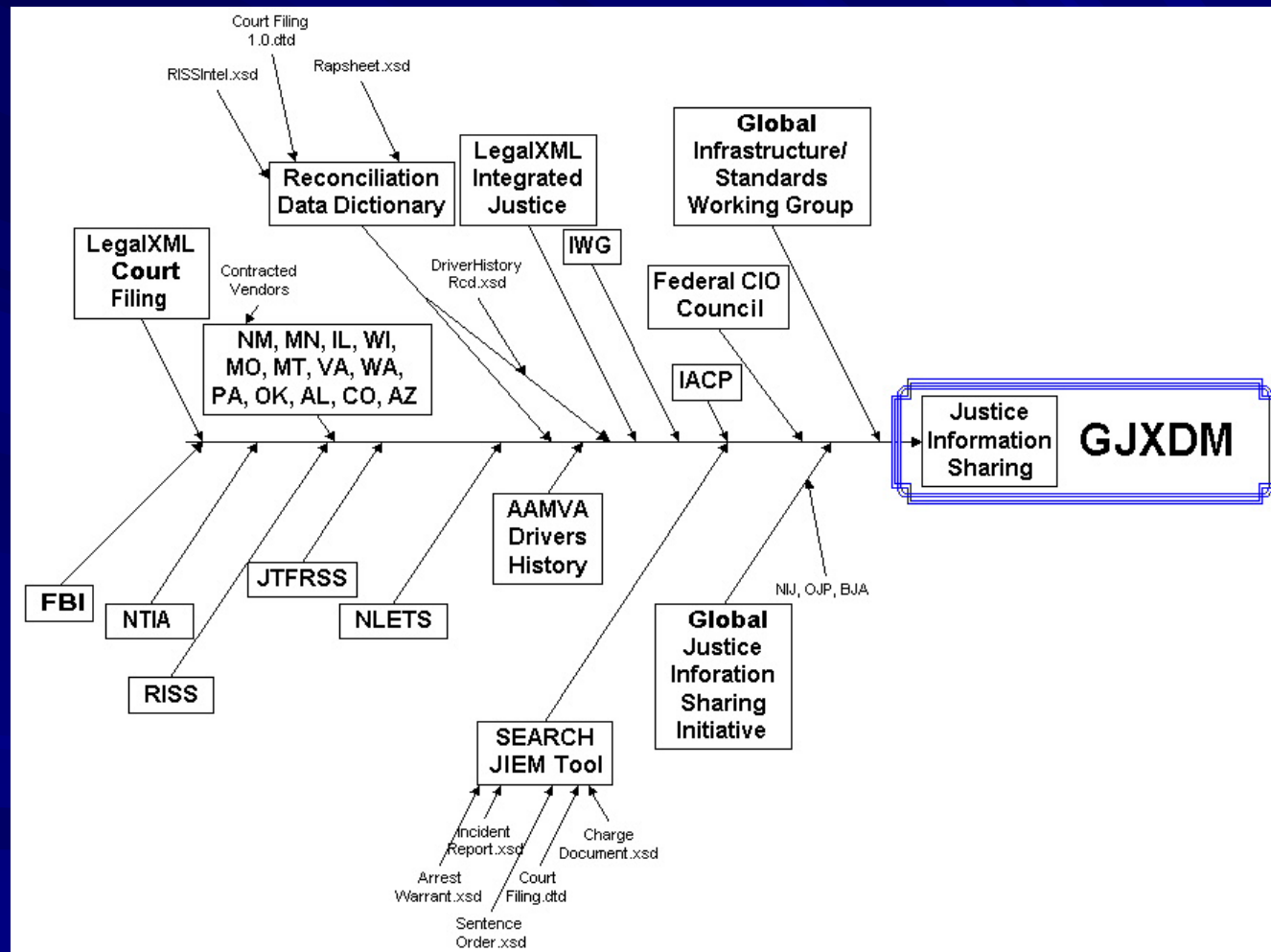
Who is Using GJXDM?

- Alaska Dept. of Public Safety
- Arkansas – Prosecutor, Court, Jail Information Exchange
- Arizona Administrative Office of the Courts
- Arizona – Maricopa County ICJIS
- Association of Motor Vehicle Administrators
- California ARJIS; LA County; Department of Justice
- Criminal Information Sharing Alliance Network
- Maine State Police
- North Carolina Criminal Justice Network
- National Law Enforcement Telecommunications System
- Orange County Florida
- Pennsylvania JNET
- Regional Information Sharing Systems (RISS)
- Minnesota CrimNet
- New Hampshire Department of Public Safety
- Syracuse (3 Police Departments and Prosecutor Office)
- Executive Office for U.S. Attorneys (EOUSA)
- Texas Department of Public Safety
- Vermont Department of Innovation and Information
- Someday...Your organization!

GJXDM Development

- Sponsored and owned by DOJ Office of Justice Programs through the Global Advisory Committee
- Developed primarily by the Georgia Tech Research Institute (GTRI)
- Global XML Structure Task Force (XSTF) provides guidance, review, issue resolution

Efforts Leading to GJXDM



Release Process

- All releases are permanent
- Backward compatibility not guaranteed
- Forwards compatibility is a goal
- Bugzilla used to ID urgent fixes
- XSTF approves all fixes, adds, deletions, and mods
- Bugzilla used to ID context and key word entries
- Change logs published with each release
- All approved changes are applied to the next release
- Features, capabilities, and tools to be released as ready
- Reference document schemas maintained for each release

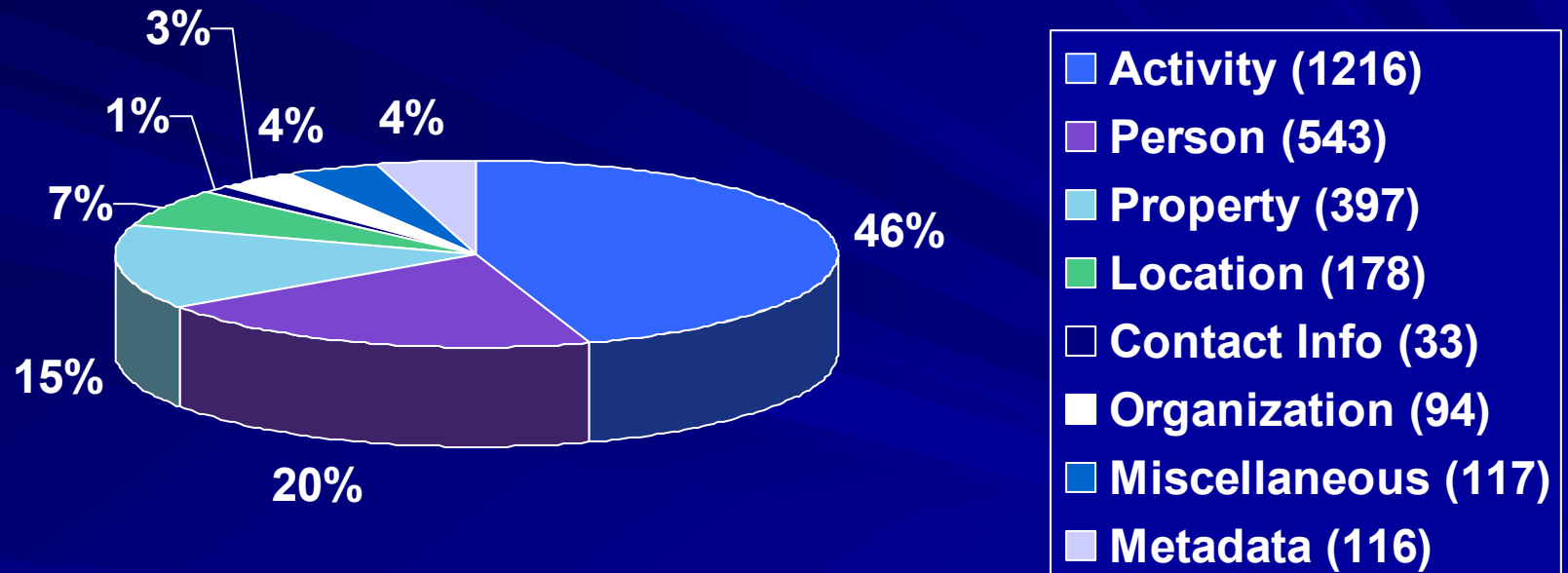
Design Criteria

- Design a common set of reusable, extensible XML data components for a Global Justice Data Dictionary (GJXDD) that facilitates standard information exchange
- Do not target specific applications or systems
- Over-inclusive and optional components
- Provide reference-able schema components
- Facilitate change and extension
- Extension methods should minimize impact on prior schema and code investments
- Implement and represent domain relationships so they are globally understood
- Use standards, similar XML efforts, and XML industry direction as a basis
- Requirements, solutions, and time constraints (often conflicting) will require rational compromises

GJXDM Components

- Types – define data structure
 - Complex types (approx 400)
 - Simple types (approx 150)
- Properties – define data semantics
 - Elements
 - Attributes (metadata)
 - Approx 2,200

GJXDM Content

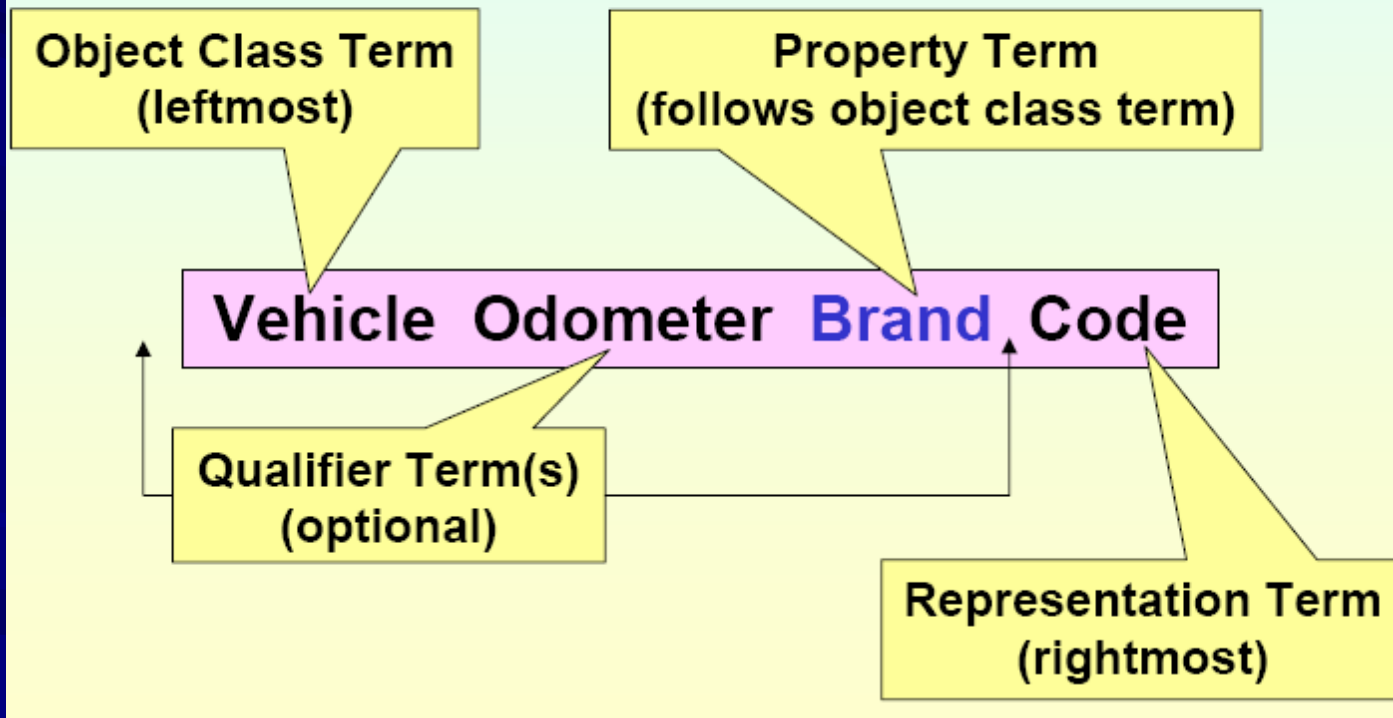


GJXDM is Object Oriented

- Uses “inheritance”
- A “child” element has all of the properties of the “parent” element in addition to its own unique properties
- Example: Person (parent) has a Missing Person (child)
- Provides a way of organizing the GJXDM in a hierarchy
- Promotes reuse and reduces the number of elements

Naming Conventions

ISO 11179 Specification & Standardization of Data Elements
– standardizes data dictionary design, names, definitions.



Representation Terms

- Amount – Monetary value with units of currency.
- BinaryObject – Set of finite-length sequences of binary octets. (secondary: Graphic, Picture, Sound, Video)
- Code – Character string that for brevity represents a specific meaning.
- DateTime – Date+time; point in time. (secondary: Date, Time)
- Identifier – Character string used to establish identity of, and uniquely distinguish one instance of an object within an ID scheme. (authorized abbreviation is ID)
- Indicator – Boolean (exactly two mutually exclusive values).
- Measure – Numeric value determined by measurement with units.
- Numeric – Assigned or determined by calculation. (secondary: Value, Rate, Percent)
- Quantity – Non-monetary numeric value or count with units.
- Text – Character string generally in the form of words. (secondary: Name)

Codes

- A character string used to represent or replace a definitive value or text
- Reasons for using codes:
 - Avoid ambiguity and errors
 - Facilitate automated processing
 - Reduce transmission time
- Enumerations are used to represent codes
- Most are external enumerations in imported XML Schemas

Extension

- A derived type may add (extension) additional fields (elements / attributes) to its base type
- A derived type may restrict one or more fields of its base type, but only so that a derived field is a subset of the field of the base type

Extension (cont.)

- Examples: A derived type may:
 - restrict an enumeration from a large set of options to a smaller set of options, as long as every option in the derived set appears in the base set
 - remove a field of the base type, but only if the field is optional in the base type
 - require a field to appear, but only if the field is optional or required to appear in the base type

Extension (cont.)

- A derived type may not modify a field of its base type such that it violates the constraints of its base type
- Examples: A derived type may NOT:
 - add additional enumerations to a field
 - remove a field that is required by its base type
 - modify the type of a field of its base type

Subset Schemas

- A subset schema is a subset of the full GJXDD that includes only the components needed for a particular implementation
- Used to improve performance where necessary
- Can also be used as a “constraint schema” to constrain the GJXDD elements used
 - Set minimum and maximum occurrences
 - Define restrictive facets (e.g., maximum length)
- Subset schemas use the same namespace as the full GJXDD

Subset Schemas (cont.)

- Rules for developing subset schemas are published

http://justicexml.gtri.gatech.edu/rules_for_schema_subsets.html

- A tool is being developed by GTRI to automatically generate subset schemas based on selection of the components you are using
- Other tools are being developed or are available

Exchange Schemas

- Exchange schemas specify (to some extent) a particular type of exchange (e.g., Amber Alert, Incident Report)
- Specify the components used in an exchange
- Import the GJXDM namespace (full GJXDM schema or subset schema)
- Can import other schemas (local or enterprise extensions)

Reference Schemas

- A reference schema is an exchange schema that has been “approved” by a cognizant organization

Conformance

- Import and reference GJXDM namespace or a correct subset
- If it exists, use the appropriate GJXDM component.
(i.e., do not create a duplicate of one that exists.)
- Be semantically consistent
 - Use GJXDM components in accordance with their definitions
 - Do not use an element to represent data other than what its definition describes
- Apply XML Schema extension rules correctly and consistently.
- Exchanges conform, NOT systems
 - What you call data or how you use it in your own system does not impact conformance
 - What counts is how you package data as XML for exchange
- There is no concept of partial conformance

Tools and Capabilities

■ Available today:

- GJXDM Search Tool
- JIEM Modeling Tool

■ Later in 2004

- Subschema Generation Tool
- Want List – XML subschema spec
- Context and key word entries

Resources

- OJP IT GJXDM web site
http://www.it.ojp.gov/topic.jsp?topic_id=43
 - Official informational web site for GJXDM
- GJXDM Namespace web site
<http://www.it.ojp.gov/jxdm/>
 - Source for the actual GJXDM
- Listserv web site
http://www.it.ojp.gov/topic.jsp?topic_id=92
 - Used for open discussion of GJXDM issues
- GTRI Bugzilla web site
<http://justicexml.gtri.gatech.edu/feedback/>
 - Used to report bugs, suggest additions

How to Implement the GJXDM

■ Decide to use it

- If you are the decision maker, direct the use of the GJXDM as policy
- If you are not the decision maker, share the vision with the decision makers
- Share the vision with everyone who will be affected

■ Involve all parties in your exchange enterprise(s)

How to Implement the GJXDM

- Develop and specify the requirements for the exchange(s)
- Normalize the required components
- Identify applicable existing reference schemas or exchange schemas
- Map required components to GJXDM

How to Implement the GJXDM

- Extend/modify existing exchange schema to meet your requirements or develop new exchange schema
- Develop subset/constraint schemas if necessary
- Supplement the exchange schemas with documentation to fully specify your exchanges

How to Implement the GJXDM

- Determine how XML and the GJXDM fits in your architectures
- Determine if and where you need to perform the following functions:
 - Parsing
 - Validation
 - Transformation
 - Application business rules
 - Data storage
 - Data retrieval

How to Implement the GJXDM

- Determine how you will exchange the instance documents
 - XML Web services
 - Reliable delivery still under development
 - Queuing
 - IBM WebsphereMQ, Microsoft Message Queuing (MSMQ), other proprietary
 - Java Messaging Service (JMS)
 - Others

Questions and Discussion